steps to improve surgical technique. Procedures can also be recorded and replayed.

In neurosurgery researchers are trying to combine live video information with three dimensional computer images of the brain to help in planning operations (W Lorensen *et al*, proceedings of medicine meets virtual reality II, San Diego, Jan 1994). This procedure uses off the shelf video products and a computer to combine the images of both signals. The surgeon sees a computed tomography scan or magnetic resonance imaging scan projected over the actual patient. The result is an intraoperative blend of video and computer data.

Volumetric stereotaxis is another method of planning neurosurgery (P Kelly, proceedings of medicine meets virtual reality II, San Diego, Jan 1994). This technique also uses datasets obtained with computed tomography and magnetic resonance imaging. The patient and the scan are linked by the technology of frameless stereotaxis. Magnetic field digitisers (tracking devices using magnetic forces) and computers are used to show where the instruments are. The intraoperative computer uses the information from the intraoperative microscope to update the surgeon continuously on the position of the surgical instrument. These methods of planning neurosurgical procedures are useful both preoperatively and perioperatively. They can help a surgeon to plan the best site for a skin incision, craniotomy, and brain incision. Such accuracy would minimise the injury to normal brain tissue. Perioperatively the procedure could pinpoint the site of the lesion, indicating in real time where the abnormal tissue ends and normal tissue begins. But, while these methods are promising, they have so far proved difficult to use. Hopefully, as the technology improves and becomes more user friendly neurosurgeons will be able to use these systems on patients with previously inoperable tumours.

Telepresence surgery is performed on a patient in an operating theatre containing a stereoscopic camera and a robot. At a separate location the surgical control workstation has a three-dimensional monitor the surgical input-output devices closely resembling the instruments that would be used in an operation.[2] This system allows a surgeon to operate on patients in remote locations and has been developed for use in battlefields. It could, however, enable specialised surgeons to operate on patients at a distance.

Although all of these systems are still being developed, they hold great promise for future training and planning and performance of surgical procedures.

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At what blood alcohol concentration should drink-driving be illegal?

Something lower than 17·4 mmol/l (0·8 g/l)

Legislators decide the maximum legal blood alcohol concentration for drivers,[1] but their decisions should be informed by the best available scientific evidence, and here researchers have a role.

Data from case-control studies of accident involvement and experimental studies of alcohol's effects on driving skills were considered before Britain introduced its blood alcohol limit in 1967.[2] Results from the Grand Rapids case-control study[3] and the Medical Research Council's research on simulated driving[4] were interpreted as supporting the limit of 17·4 mmol/l. Different analyses of the data, however, could have supported a lower legal limit of 10·9-13·0 mmol/l.[5,6]

Reviewing data from several case-control studies, the National Research Council of the United States concluded that focusing on the risk of crash responsibility (as opposed to crash involvement) or alternatively controlling for the driver's drinking experience supported legal limits below 17·4 mmol/l.[6] It decided that "for large groups of drivers the responsibility for crashes increases when the driver judged culpable for the crash has a blood alcohol concentration greater than 8·7 mmol/l." When the case control data were controlled for experience with alcohol the risk of crash involvement began increasing at the lowest blood alcohol concentrations measured.

Behavioural studies suggest that driving related skills are significantly impaired at blood alcohol concentrations below 10·9 mmol/l and that little evidence exists for a threshold below which driving related skills are unimpaired.[1,6,7] In another recent review of behavioural studies, Kruger concluded that driving skills were significantly impaired at blood alcohol concentrations between 6·5 and 17·4 mmol/l, depending on the task's demands and complexity.[8] Kruger believed, however, that "a general endangerment probably only takes effect at blood alcohol concentrations at or above 15·2 to 17·4 mmol/l." This probably reflects the fact that experienced drinkers with good psychomotor skills show relatively little impairment, even at blood alcohol concentrations of nearly 21·7 mmol/l, on simple driving tasks.[9]

Furthermore, Kruger suggested that "additional arguments" would be needed to justify a limit lower than 15·2 mmol/l. Probably the strongest additional arguments come from the falls in drink-driving behaviour and related casualties that lowering the legal limit may achieve.

A recent report examined the effect of reducing the limit from 17·4 mmol/l to 10·9 mmol/l in the Australian Capital Territory.[10] Among drivers sampled at random road blocks significantly fewer had blood alcohol concentrations over 32·6 mmol/l and between 10·9 and 17·4 mmol/l than before the law was changed.

In addition, the proportion of drivers with blood alcohol concentrations above 17·4 mmol/l involved in accidents fell by one third, and these effects seemed sustained for at least 12 months after the change. The overall number of accidents fell by 6%. This study suggested that behavioural change is possible without increasing the demands made on the police —one of the factors that would militate against change.

Whether a limit of 10·9 mmol/l would substantially affect the more serious offenders is difficult to judge. A lower legal limit might not deter those current drink-drivers who believe that their skills are unimpaired by their current levels of drinking unless they thought that there was a high risk of getting caught.[11,12] Many serious offenders (those with multiple convictions or very high blood alcohol concentrations) are dependent on alcohol, and changing the limit is unlikely to affect their behaviour.[12] A lower limit operating alongside random breath testing might, however, affect these hard core drink-drivers.[13]

The combined results of these studies show clear support emerges for changing the legal drink-driving limit from 17·4 mmol/l to 10·9 mmol/l. While Britain and other countries debate this issue, clearly the higher limits such as those found in some states of the United States and in the Republic of Ireland should be lowered. The researchers have done their job; it is now in the hands of the elected representatives.

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Healthcare resource groups

A more sensitive and less costly approach to contracting

Doctors in Britain may not have a burning interest in contracting, but their future depends on it. Contracting is now impinging on doctors' training and employment and may lead to departments or even whole units closing. Doctors can either allow serendipity to determine mechanisms for contracting or act to improve the process for the benefit of patients.

In the everyday world of commerce customers buy products with clearly labelled prices and know exactly what they are getting for their money. But the health service is different. Until recently there has been no way of assigning costs to health care and prices have varied widely among hospitals. Purchasers hardly know what they want to buy and have no description of what they are buying. The block contract is a blunt instrument that counts cases on the basis of finished consultant episodes. These defy definition: for low back pain an extensive laminectomy and an epidural anaesthesia may be counted the same.

Systems for costing health care and defining its products are urgently needed. This is not just an academic exercise: whether providers survive depends on their contracts with purchasers. To facilitate this process the national steering group on costing has already produced an executive letter laying down the rules for costing.[1] The remaining problem is how to define these packages of care. Fundholding general practitioners can purchase distinct operations from a list issued by the NHS Executive, but this contracting, on a cost per case basis, is very expensive to run.

There is now a more precise and cheaper method of assigning health care costs. Healthcare resource groups, developed by doctors with the help of the National Casemix Office, were originally designed to improve on the unsatisfactory system of American diagnosis related groups. Healthcare resource groups are based on ICD diagnostic codes, with codes for procedures from the Office of Population Censuses and Surveys; they also take account of data on age, complications, and comorbidity. They allow patients to be allocated to groups that both are clinically similar and use similar amounts of resources. The groups have been developed by clinical working groups led by a clinical leader nominated by the relevant royal college or professional association. They have also been evaluated statistically to ensure that they are both clinically homogeneous and homogeneous in terms of resources (as indicated by length of stay). Although length of stay is not a perfect indicator of cost, it is readily available and correlates closely with costs when such data are available.

Proposals for the second version of healthcare resource groups were widely distributed for consultation last November.[2] This latest version has an additional process whereby an independent assessor nominated by each college or association provides quality assurance on behalf of each specialty. But these are still only steps towards better contracting—the second version is not the final product. The consultation process has ended, and details of the final groups have now been delivered to the software developers and will be available this August.

How will healthcare resource groups be used? Firstly, they will be used to produce comparative costs within specialties. In 1994-5 hospitals will be asked to cost two out of three specialties using healthcare resource groups and by 1997-8 all specialties will be costed to inform the contracting process. The use of these costs will enable purchasers to compare prices on a fairer basis than currently, but contracts will not have to be specified in terms of healthcare resource groups. For example, for a particular specialty future contracts might be specified in terms of healthcare resource groups covering 80% of the workload, the number of cases in each resource group, and the price per case. Purchasers and providers can then be clearer about their responsibilities and liabilities in relation to the contract that they have agreed.

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